A DISSERTATION ON

VOCAL CORD PATHOLOGY

M.S. Degree (Branch IV)

OTO - RHINO LARYNGOLOGY

THE TAMILNADU

DR.M.G.R. MEDICAL UNIVERSITY

CHENNAI, TAMILNADU

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CERTIFICATE

This is to certify that this dissertation entitled "VOCAL CORD PATHOLOGY" submitted by DR. M. KRISHNA SUNDARI to the faculty of OTO-RHINO LARYNGOLOGY, The Tamil Nadu Dr. M.G.R. Medical University, Chennai, in partial fulfilment of the requirement for the award of M.S.Degree, Branch – IV (OTO - RHINO LARYNGOLOGY), for September 2006 examination is a bonafide research work carried out by her under our direct supervision and guidance.

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DECLARATION

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This is submitted to The Tamil Nadu Dr. M.G.R. Medical University, Chennai, in partial fulfilment of the requirement for the award of M.S. Degree, Branch IV (OTO - RHINO LARYNGOLOGY) degree Examination to be held in SEPTEMBER 2006.

Place : Madurai

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CONTENTS

		Page No.
1.	INTRODUCTION	1
2.	AIM OF THE STUDY	2
3.	HISTORICAL REVIEW	3
4.	ANATOMY	4
5.	AETIO PATHOLOGY	10
6.	CLINICAL FEATURES & INVESTIGATIONS	15
7.	DIAGNOSTIC TOOLS	21
8.	MANAGEMENT	24
9.	PHONO SURGERY	29
10.	REVIEW OF LITERATURE	32
11.	CASE STUDY	36
12.	OBSERVATIOJN	55
13.	DISCUSSION	60
14.	CONCLUSION	61
	BIBLIOGRAPHY	
	MASTER CHART	
	ABBREVIATION	

INTRODUCTION

Larynx is an eloquent organ. It lodges the vocal cord which initiate the voice, aids respiration, protects lower respiratory tract. Any disease or disorder interfering with approximation, tension or vibration of vocal cord will cause change in quality, pitch and loudness of voice. Hoarsness indicates an early laryngeal disorder. Stridor is a noisy breathing due to the obstruction of the upper airway tract.

Laryngeal malignancy accounts for 10% of all head and neck malignancies of which vocal cord malignancy is common. It affects essential function of speech and respiration. Hence early impact is felt with early detection and treatment, five years survival with high cure rate is possible.

This dissertation reviews the existing knowledge in these spheres and studies the clinical and pathological parameters and outcome of benign, Malignant and paralysis of vocal cords.

AIM OF THE STUDY

1. This is a comprehensive study of various causes of vocal cord pathology
2. To Analyse the following
   - The Incidence of cases in various age groups
   - The distribution of cases in each sex
   - Aetiopathogenesis of cases
   - Clinical features of cases
   - Various diagnostic tools and documentation
   - Various Modalities of treatment
   - Prognosis of various vocal cord pathology and voice disorder

HISTORICAL REVIEW

Advent of Laryngeal mirror by Manual Garcia in September 1854 in Paris brought about a radical changes in study of larynx which was negligible till then.

Kleinsasser laryngoscopes and zeiss microscope have made great advances in endo laryngeal surgery. Dr. Brain Polord developed a special endotracheal tube for microlaryngeal surgery.

Fibre optic illumination invention provided a reliable system of illumination a head of Negus & Jackson lighting system. Fibreoptic illumination is used in

i) Transnasal fibreoptic laryngoscopy

ii) Telescopic laryngoscopy

iii) Video stroboscopy

iv) Flexible fibreoptic videolaryngoscopy

ANATOMY

DEVELOPMENT :

The larynx, trachea, bronchi and lungs are developed from a midline ventral respiratory diverticulum namely the laryngotracheal groove.

Surgical Anatomy :

The frame work of the larynx is made up of three unpaired cartilages – epiglottis, thyroid and cricoid and three paired cartilages-arytenoids, corniculates and cuneiforms and ligaments.

The thyroid cartilage shields the opening to the airway and supports most of the soft tissue folds in the larynx. The angle between the laminae of the thyroid cartilage exhibits sexual dimorphism in adult humans with 90 degree angle in men and a 120 degree angle in females. The laminae of the thyroid cartilage fuse at the midline symphysis with an intra thyroid segment after birth, but it is not unusual to find intra thyroid cartilage in the midline in infancy. The posterior aspect of the isthmus receives cluster of five elastic ligaments a median thyro-epiglottic ligament. Paired vestibular ligaments and paired vocal ligaments. The thyroid cartilages has two superior horns which aid in its suspension from the hyoid bone and two inferior horns which articulate with the cricord cartilage.

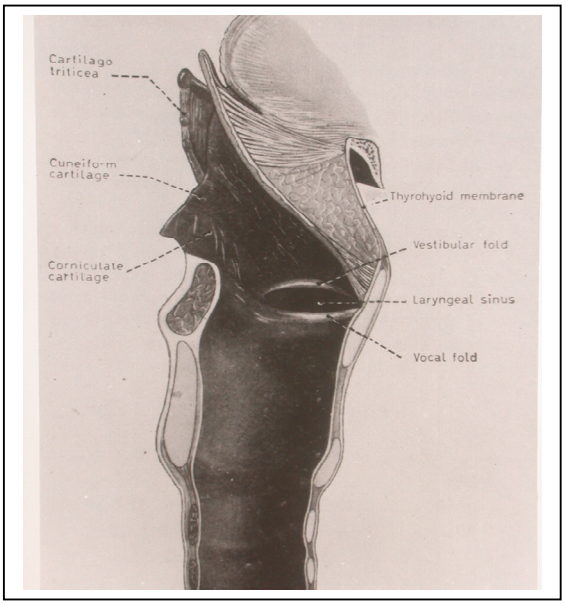
On the lateral surface of the laminae are faint ridges oriented obliquely. Extrinsic muscles attach here that move the larynx or accelerate its movement relative to the adjacent tissues.

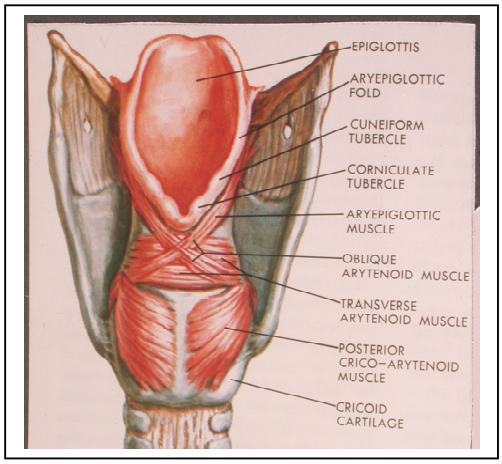
The cricoid cartilage is the only complete cartilage ring in the larynx and serves to support posterior structures in the larynx. The anterior portion of the cricoid arch is 5 to 7mm high whereas the posterior lamina is 2 to 3 cms high and is marked by a posterior midline ridge, which receives longitudinal fibres of the oesophagus. The superior aspect of the cricoid lamina has two articular surfaces, which are convex and elliptical passing down to the arch.

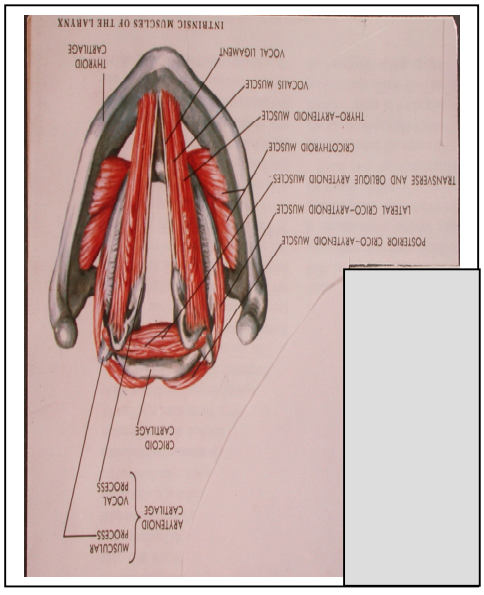
The arytenoid cartilages are paired and serve as the posterior support for the laryngeal folds. These cartilages are of low mass and allow abduction and adduction oscillations to occur in less than 0.1 second. The shape of the arytenoid cartilage may be viewed as an upside down 'T'. The aryepiglotic fold attaches to the apex of the vocal fold to its medial projection. The articulation of the arytenoids with the cricoid is critical for an understanding of the function of the larynx. The corniculate cartilage are found at the apices of the arytenoids cartilages.

The epiglottis is anchored anteriorly to the posterior surface of the hyoid bone by the hyoepiglottic ligament. The potential space between the anterior surface of the epiglottis and the inner surface of the thyrohyoid membrane and hyoid bone is described as the 'pre epiglottic space.'

ANATOMY


Cartilago triticea
Cuneiform cartilage
Corniculate cartilage
Thyrohyoid membrane
Vestibular fold
Laryngeal sinus
Vocal fold


EPIGLOTTIS
ARYEPIGLOTTIC FOLD
CUNEIFORM TUBERCLE
CORNICULATE TUBERCLE
ARYEPIGLOTTIC MUSCLE
OBLIQUE ARYTENOID MUSCLE
TRANSVERSE ARYTENOID MUSCLE
POSTERIOR CRICO–ARYTENOID MUSCLE
CRICOID CARTILAGE


INTRINSIC MUSCLES OF THE LARYNX
THYROID CARTILAGE
VOCAL LIGAMENT
VOCALIS MUSCLE
THYRO–ARYTENOID MUSCLE
CRICOTHYROID MUSCLE
TRANSVERSE AND OBLIQUE ARYTENOID MUSCLES
LATERAL CRICO–ARYTENOID MUSCLE
POSTERIOR CRICO–ARYTENOID MUSCLE
CRICOID CARTILAGE
ARYTENOID CARTILAGE
VOCAL PROCESS
MUSCULAR PROCESS

The muscles of the larynx may be divided into extrinsic & instrinsic muscles. The extrinsic muscles are the sternothyroid, thyrohyoid, stylopharygeus, palato-pharyngeus and the inferior constrictor.

The intrinsic muscles between one laryngeal cartilage and another are

1. Abductors of the vocal cords only one on each side-posterior Crico arytenoid muscle.
2. Adductors of the vocal cords ; there are three on each side
   a) Lateral crico arytenoid muscle
   b) Transverse portion of interarytenoid muscle
   c) External portion of thyro-arytenoid muscle
3. Tensors of the vocal cords : There are two on each side
   a) Cricothyroid muscle
   b) Internal portion of thyroarytenoid (vocalis) muscle
4. Opener of laryngeal inlet
   Thyroepiglottic muscle
5. Closers of the laryngeal inlet :
   a) oblique portion of interarytenoid muscle
   b) Aryepiglottic muscles

The quadrangular membrane extends from the sides of the epiglottis to the corniculate and arytenoids cartilages, with the mucous membrane covering it the upper border of the quadrangular membrane forms the aryepiglottic fold,

while the remainder of the membrane forms the wall between the pyriform sinus and the larynx. The conus elasticus, cricothyroid membrane arises from the upper border of cricord cartilage and sweeps medially and upward, the more posterior part attaches to the arytenoids cartilage and its vocal process, while most of the remainder attaches in the vocal ligament or vocal cord, which can therefore be regarded as thickened and specially developed free edge of conus elasticus.

The vocal ligament consists of thickned bands of elastic tissue attached anteriorly to the inner aspect of thyroid cartilage at the mid line and posteriorly to the apices of the arytenoid cartilage.

The ventricular bands are two thick folds of mucous membrane covering the ventricular ligament and upper part of the external portion of the thyroarytenoid muscle.

The laryngeal vestibule lies between the inlet and the edges of the false cords. Ventricle of the larynx is a recess between the false and true vocal cords. It is lined by a mucous membrane which is covered externally by the thyroarytenoid muscle. The glottis is the interval between

i) the true vocal cords in its anterior three fifths

ii) The vocal processes of the arytenoid cartilages in its posterior two fifths. The subglottic space lies between the true vocal cords and the lower border of the cricord cartilage.

The true vocal cords are covered by squamous epithelium. The subglottic space is normally lined entirely by columnar ciliated epithelium, but islands of transitional or squamous epithelium are found. Mucous glands are freely distributed throughout the membrane.

Reinke's space is immediately under the epithelium and superficial to an elastic layer. There are no glands beneath this layer. Injuring it may leads to oedema or to polypus formation. This firm layer is characterized by an absence of lymphatics. It acts as a barrier to the spread of the carcinoma.

Blood Supply :

The blood supply is derived from the laryngeal branches of the superior and inferior thyroid arteries and the cricothyroid branch of the superior thyroid artery.

Nerve Supply:

The larynx is supplied by the branches of the vagus nerve. Superior laryngeal nerve has two laryngeal branches.

1. Internal Branch :

Entirely sensory. It pierces the thyrohyoid membrane with the superior laryngeal artery and vein. It supplies the cavity of the larynx as far down as the level of the vocal cords.

2. External Branch :

Travels down on the inferior constrictor muscle of the pharnx. It supplies the cricothyroid muscle. Recurrent (inferior) laryngeal nerve has a much longer course on the left side than on the right. On the left side it turns round the subclavian artery. In the neck it lies between the trachea and oesophagus as it approaches the larynx. Its terminal part passes upwards, under cover of the ala of the thyroid cartilage immediately behind the inferior cricothyroid joint. It then divides into

a) An antero lateral(motor) branch which supplies all the intrinsic muscles of the larynx except the cricothyroid muscle. No fibres cross the midline and there is no special differentiation between those supplying abductors and those supply adductors.

b) Postero medial (sensory) branch which supplies the cavity of the larynx below the level of the vocal cords. The loop of Galen is formed by nerve fibres which pass between the postero medial branch of the recurrent laryngeal nerve and the internal branch of the superior laryngeal nerve.

Lymphatic Drainage :

Supraglottic area drains into preepiglottic and upper deep cervical nodes. Subglottic drains into prelaryngeal, pretracheal, paratracheal, lower deep cervical and mediastinal nodes.

Glottic vocal cords themselves have practically no lymphatics

AETIO PATHOLOGY

1. Multiple papilloma of Larynx :

Recurrent respiratory papillomatosis. Most common benign tumour affecting larynx. Characterized by multiple and recurrent squamous papillomas, commonly involving glottis. Other sites are epiglottis, trachea and bronchi. Squamous papilloma composed of bland hyperplastic squamous epithelium around fibrovascular cores. Associated with HPV 6 & 11.

Juvenile onset is common in mothers with genital condylomata.
Adult onset due to increased number of sex partners and more frequent oral sex.

2. Solitary Papilloma :

Epithelial hyperplasia or keratosis is potentially malignant lesion. Aetiology of this disease is not clearly known. Nis Kanan ko (1951) mentioned some precipitating causes like vocal abuse, alcohol, tobacco and chronic respiratory infection. It is common in adult males in 30-50 age group.

It is a sessile or pedunculated, granular and lobulated mass consisting of finger like processes of vascular connective tissue stroma, covered by layers of epithelium with a normal basal cell layer, either a keratotic or parakeratotic surface. The keratotic surface is usually seen in adult papillomas.

3. Vocal Nodules :

Morel Mekenzie (1880) documented the frequent occurrence of nodules and polyps of vocal cords. Vocal nodules are common benign laryngeal lesions, but are not neoplasms. Typically the lesion consists of a small mass of inflammatory tissue at the middle of the membranous true vocal cords.

The condition is almost exclusively a disease of professional voice users. Brodnitz (1963) suggests that neuromuscular incoordination during voice production plays an important role. Nodules occur more frequently in females. Rare in children. Common in the age group of 30 to 40.

4. Vocal cord Polyp :

Polypoid swelling of the membranous part of the vocal cords. The exact aetiology of vocal cord polyp is uncertain but misuse of voice is considered in the majority of cases. Common in the 5^{th} decade and affect males more than females.

In abuse of voice and irritation due to smoking, there is injury to the mucosal lining of the vocal cords and Reinkes space. The irritation causes inflammation and reactive oedema in the sub mucosal layer resulting in the development of a polypoidal lesion.

5. Angio Fibroma of vocal cord :

This lesion may be more vascular when small haemorrhages occur or becomes more fibrous depending upon the content. The aetiology is not clearly known but it is thought to be due to the vocal abuse. It is seen in patients with hyperkinetic dysphonia. More common in males between 20-50 years of age.

Fibroangioma is unilateral in distribution and attached to the free margin of the vocal cords. They may be sessile or pedunculated. Macroscopic appearance is pink in colour due to increased vascularity. Vascular engorgement and micro haemorrhages occur followed by oedema and polyp formation. Depending upon the histological pattern they may be more vascular or fibrous.

6. Intubation Granuloma :

Following long term intubation, granulomas are caused by ulceration of mucosa over vocal process of arytenoid cartilages.

Can develop if perichondrium is damaged depending on duration of intubation, size and type of tube.

Always unilateral situated medially or superiorly on vocal process.

7. Tuberculous Laryngitis :

Primary laryngeal tuberculosis is very rare and usually it is secondary to pulmonary tuberculosis. The tubercle bacilli reach the laryngeal mucosa through the contaminated sputum. In a small number of cases the haematogenous route of lymphatic spread is the source of infection. Males are more commonly affected.

It presents in four clinical stages. i) infiltration ii) ulceration, iii) perichondritis, iv) Tumour formation. When the cords are ulcerated on the free margins they exhibit typical moth eaten appearance. Infiltration with tuberculous granulation tissue has predilection for posterior commisure, arytenoids and vocal cords.

8. Vocal Cord Paralysis :

Lesion can affect motor nerve supply anywhere from nucleus Ambigus in the brain stem to the neuromuscular junction in larynx, involving vagus or its recurrent branch. It can be unilateral or bilateral. It is more common on left side.

9. Glottic Carcinoma :

Most of the tumors arising in the glottic region originate on the free margins of the vocal cords which are covered by a squamous epithelium.

Vertical extension of glottic carcinoma to the sub glottis and or supra glottis seems to occur more frequently than extension to opposite side. Fixation of vocal cord indicates deep invasion with involvement at least of the thyroarytenoid muscle. Low incidence of lymphnode metastases is seen in tumors confined to the vocal cords.

It occurs in male than in female. Alcohol, smoking, tobacco chewing are predisposing factors. Carcinogens like polynuclear hydrocarbons and N-nitros compounds are found in cigarette smoke.

CLINICAL FEATURES AND INVESTIGATIONS

1. MULTIPLE PAPILLOMA OF LARYNX :

1. Persistent hoarseness of voice is the usual symptom in children
2. Difficulty in breathing is common. Some times the child may present with acute dyspnoea or stridor.

Indirect laryngoscopy shows the papilomatous mass arising from the vocal cords, ventricular bands and even supra-glottic region.

2. SOLITARY PAPILLOMA :

Clinical Features :

Common in adult male in the age group of 30-50 years

Hoarseness of voice is the common feature.

Investigation :

Blood and urine examination

Indirect laryngoscopy

Direct laryngoscopy

3. VOCAL NODULES

Clinical Features :

Usually seen among male children and young adult women. Persons are characterized as talkative, boisterous or verbally aggressive. Nodules are an occupational hazard for teachers, telephone operators,

entertainers, singers and mothers of young children. Hoarseness of voice, vocal fatique and sensations of aching and tiredness are presenting symptoms.

Investigations :

Indirect laryngoscopy

Direct laryngoscopy

High quality audio recordings

Video recordings provide documentation and comparisons before and after therapy or surgery

4. VOCAL POLYP :

Vocal polyp occurs as a result of vocal abuse as a consequence of chronic laryngitis and heavy smoking. Affects men mostly in age group of 30-50.

Hoarseness is common (large polyps cause dyspnoea, stridor and intermittent choking)

Investigations :

Indirect laryngoscopy

Direct laryngoscopy

High quality audio recordings

Video recordings provide documentation and comparisons before and after therapy or surgery

5. ANGIO FIBROMA VOCAL CORD :

CLINICAL FEATURES

Common in males in age group of 30-50 years

Hoarseness of voice, dry cough associated with frequent clearing of throat

History of voice abuse

Investigations

Indirect laryngoscopy

Direct laryngoscopy

High quality audio recordings

Video recordings

6. INTUBATION GRANULOMA :

As a result of injury to vocal process of arytenoids due to rough intubation, large tubes and prolonged intubation.

They present with hoarsness, irritation or pain in throat.

7. TUBERCULOUS LARYNGITIS

CLINICAL FEATURES

Occurs as a secondary pulmonary tuberculosis

Hoarseness of voice

Cough with expectoration

Pain during swallowing

INVESTIGATIONS

Urine and blood examinations

X – ray chest posterio anterior view

Sputum for acid fast bacilli

Indirect laryngoscopy

Direct laryngoscopy

High quality audio recordings

8. VOCAL CORD PARALYSIS :

CLINIAL FEATURES :

Unilateral vocal cod palsy

Breathy voice, weak cry. Aspiration of pharyngeal secretion, cyanotic attacks and choking during feeds.

Bilateral abductor palsy leads to severe stridor

INVESTIGATIONS :

Blood & Urine examination

Indirect laryngoscopy

Direct laryngoscopy : Confirms findings, examines vocal cord movement and crico arytenoids movements. Place tip of laryngoscope in vallecula to prevent distortion of the vocal cord movement.

High quality audio recordings.

Video recordings

Position of vocal cord

Median

Paramedian : 3.5 mm

Cadaveric : 7.0 mm

Gentle abduction : 13.5 mm

Full abduction : 19.0 mm

Scopy : Nasopharyngoscopy

Oesophagoscopy

Bronchoscopy

Mediastinoscopy

X – ray chest PA view : Associated PT,

Secondaries

Mediastinal widening

Left atrial enlargement

Aortic aneurysm etc.

X – ray skull base : any secondaries

X – ray sinuses & skull

Tomogram

CT scan & MRI

Laryngogram

Barium swallow : Growth extension

Left atrial enlargement

Electrocardiograph

9. GLOTTIC CARCINOMA

CLINICAL FEATUES :

Hoarseness of voice

Supraglottic lesion produces muffled voice

Subglottic obstruction to airway is earlier symptom

Painful swallowing

Some times with a neck mass

INVESTIGATIONS

Urine and blood examinations

Indirect laryngoscopy

Direct laryngoscopy and biopsy

Photographic or videographic documentation

High quality audio recording

X ray chest PA view

Liver function tests.

DIAGNOSTIC TOOLS

1. Indirect Laryngoscopy :

This is an important procedure useful both as clinical examination and as a simple, basic noninvasive clinical investigation. Properly done indirect laryngoscopic examination along with the examiners experience clinches the diagnosis of vocal cord paralysis and the exact position of the vocal cords or various function like deep inspiration phonation at rest and quite respiration.

2. Direct Layngoscopy :

In this method, larynx is visualized directly using a rigid endoscope with light source under local anaesthesia. Its gives more accurate picture of the lesion. Ventricles are also visualized

3. Suspension Laryngoscopy :

Is another method of examination of larynx under general Anaesthesia. This is a combined examination with operating microscope with 400 mm objective lens.

Advantage : Using both hands free for intra laryngeal manipulation and presents a magnified view of the larynx.

4. Flexible fibreoptic Nasaendoscopy :

It may be used immediately in out patient session, and patients in whom indirect laryngoscopy is unsatisfactory. Here dynamic

function of the larynx is more deeply assessed. It can be attached to video cameras and can be documented.

In tracheostomized patient, retrograde examination of the vocal cords and subglottis can be made

5. Stroboscopy :

By synchronizing an intermitten flash of light with the vibrations of the cords on phonation, their movement can be effectively reduced to slow motion or frozen section.

6. Pan endoscopy :

Complete examination of nasopharynx, larynx, hypopharynx, oesophagus is done to find the cause of vocal cord paralysis

7. Radiological Investigations :

a) Plain x ray neck lateral view. soft tissue, shadow which shows the ventricles, subglottic air column, prevertebral shadow

b) Plain x ray chest to rule out mediastinal tumour, secondaries and cancer of lung

c) X ray skull – submentovertical view and base of skull

8. Tomography :

In the larynx Tomographic studies shows true functional vocal cords, vocal cord paralysis.

9. Computed Tomography :

Provided quick noninvasive, effective radiological investigation of the larynx, cartilage invasions of tumours, extension of tumours and size of tumours

10. Magnetic Resonance Imaging :

Soft tissue involvement as pre-epiglottic spread confirmed.

11. Thyroid Scanning :

To rule out malignancy and infiltration of neck.

MANAGEMENT

1. MULTIPLE PAPILLOMA :

1. Surgery : Endoscopic surgical removal
2. Biopsy and total destruction of papilloma with CO2 laser are carried out. In the event of recurrence, laryngoscopy or CO2 laser is repeated.

Adjuvant theraphy : Various therapies that have been tried includes 5 – fluoro uracil, systemic cis-retinoic acid and interferon.

If airway support is needed tracheostomy is done.

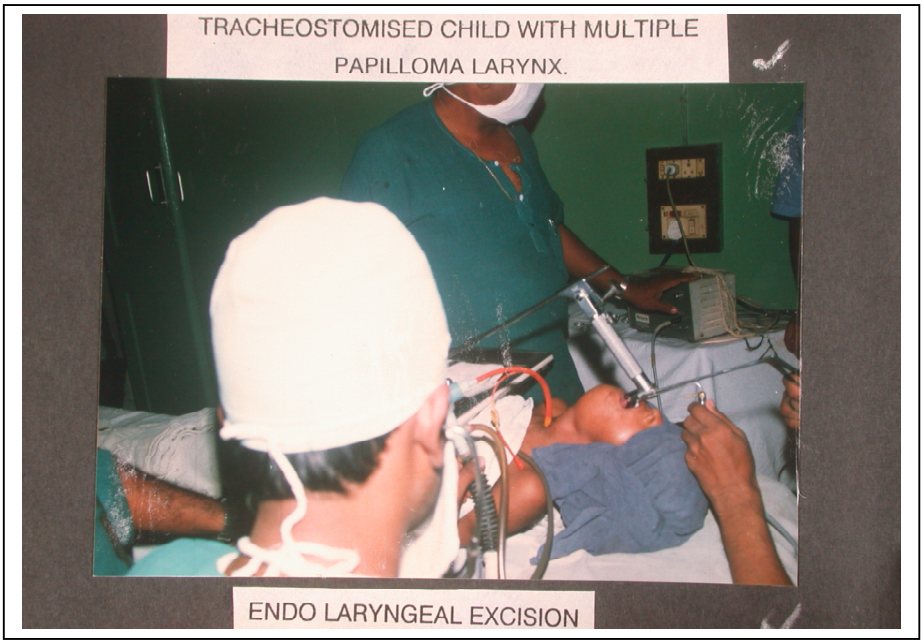
2. SOLITARY PAPILLOMA

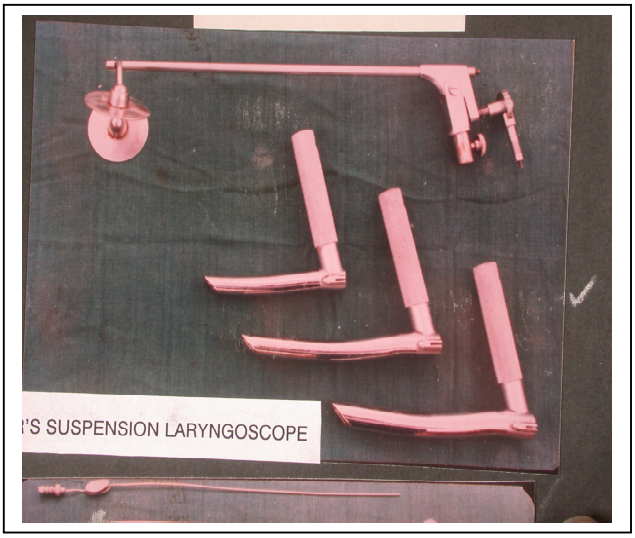
Under general anaesthesia Kleinsasser's suspension laryngoscope with storz fibreoptic illumination was used. Removal of papilloma was done with sharp microlaryngeal cup forceps. Post operative course of antibiotics, voice rest was advised for two weeks. An advice to avoid precipitating factors like vocal abuse, tobacco chewing, smoking and alcohol should be given.

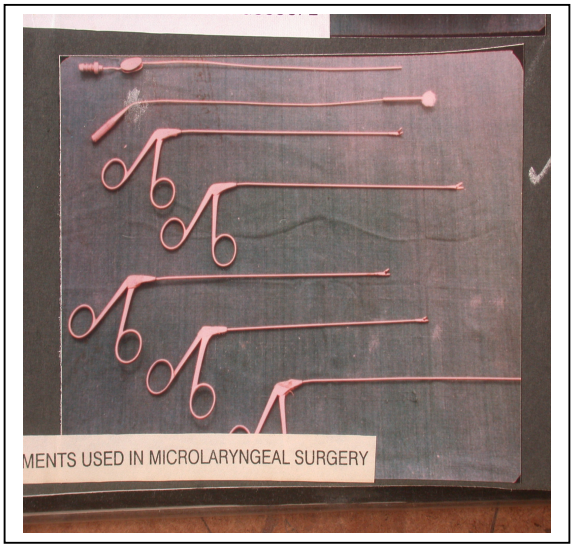
3. VOCAL NODULES :

Treatment of vocal cords with absolute voice rest is mandatory. Some cases may need Kleinsasser direct laryngoscope and microlaryngeal removal under general anaesthesia. Post operative voice rest for six weeks is mandatory. Voice abuse has to be avoided post operatively.

MICRO LARYNGEAL SURGERY







Conservative management may sometimes lead to recurrence of vocal nodules if they continue to have voice abuse.

4. VOCAL CORD POLYP :

The treatment of the polyp is by removing them off the vocal cord with large cupforceps under operating microscope without damaging the normal tissue. Using direct laryngoscopy under general anaesthesia the polyps from free margin of the cord will be grasped by microlaryngeal cupforceps pulled medially and carefully trimmed by using the microlaryngeal scissors. Improvement of voice will be good. Voice rest for a period of two to four weeks followed with one week course of antibiotics. Speech therapy will help to correct the faulty voice production.

5. ANGIOFIBROMA OF VOCAL CORD :

Microlaryngeal surgery under general anaesthesia using Kleinsasser's suspension laryngoscope. Antibiotic course for a week and voice rest for 2 to 4 weeks. Voice rehabilitation and regular follow up to see any recurrence of voice disorder.

6. INTUBATION GRANULOMA :

Surgery is the only treatment for fibroma vocal cord. Under general anaesthesia Kleinsasser's suspension microlaryngoscopy done, vocal cords visualized the mass has to be removed completely by using Patterson's forceps and microlaryngeal cup forceps. Post operative

voice will be normal. Voice rest is advised for a period of 4-6 weeks with periodic review.

7. TUBERCULOUS LARYNGITIS :

Prior to the advent of streptomycin and rifampicin, treatment of laryngeal tuberculosis was verymuch difficult. In the past various forms of treatment like galvano cautery, heliotherapy curettage , excision, amputation of epiglottis and avulsion of superior laryngeal Nerve was tried.

Medical Treatment :

Injection Streptomycin

Cap Rifampicin

T. Pyrizinamide

T. INH

T. Ethambutol

Theraphy of appropriate dosage for appropriate period gives good result.

Voice Therapy :

1. Reduction in pharyngeal tension, attention to relaxation and central breathing
2. Vocal exercise on higher pitch to reduce oedema
3. Voice rest.

8. VOCAL CORD PARALYSIS :

COMPLETE PARALYSIS (RLN PARALYSIS)

Total section or damage to recurrent laryngeal nerve may be unilateral or bilateral. If both abductors and adductors are paralysed cord will lie at para median position due to action of cricothyroid which is not involved here.

COMBINED PARALYSIS :

If superior laryngeal nerve and recurrent laryngeal nerve paralysis occurs cord will lie at cadaveric position. Poor voice, aspiration, effortless cough are present. Respiration is not affected or normal.

SUPERIOR LARYNGEAL NERVE PALSY :

Secondary paralysis, chocking particularly for liquids, vocal weakness because of crico thyroid muscle paralysis.

9. GLOTTIC CARCINOMA :

Glottic carcinoma only rarely requires treatment directed to the cervical lymphatics.

Various modalities of treatment used in glottic carcinoma

Carcinoma in situ :

Mucosal stripping

CO_2 laser

T1 :

Radiotherapy

CO_2 laser

T2 :

Radiotherapy

Partial laryngectomy

T3 & T4

Total laryngectomy with rehabilitation of vocal function.

PHONO SURGERY

All operations that deal with function of phonation can be called phono surgery.

CLASSIFICATION :

1. Removal of pathologic mass lesions of the phonatory organ by microlaryngeal surgery
2. Surgical correction of the position, shape and or tension of the vocal cords.
3. Surgical procedures involving the laryngeal nerves and muscles
4. Surgical reconstruction of the voice box for partial loss or deformity of the larynx
5. Surgical methods for restoration of a laryngeal speech.
6. Laryngeal frame work surgery as popularized by prof. Nobhiko Isshiki. This can be classified into four types.
   a) Medialisation of vocal cord - Thyroplasty Type I
   b) Lateralisation of vocal cord - Thyroplasty Type II
   c) Relaxation of vocal cord - Thyroplasty Type III
   d) Tensing of vocal cord - Thyroplasty Type IV

INDICATIONS :

Apart from polyps, nodules, cysts and growths, the other indications for phonosurgery are

1. Unilateral vocal cord paralysis
2. Sulcus vocalis – a disorder causing history of long standing dysphonia not diagnosed frequently

Direct Laryngoscopic examination of the larynx shows varying degrees of longitudinal grooves along the free margins of the vocal cords either on one or both sides with hypoplasia and bowing of the cords.

3. Deficient vocal cord tissue as a result of surgery or trauma.

EVALUATION OF VOCAL FUNCTION :

Indirect Laryngoscopy

Direct laryngoscopy

Microlaryngoscopy with 400 mm objective

Rigid laryngoscope with 70 or 90 telescope

Flexible fibreoptic nasal laryngoscope

Videolaryngoscopy

Stroboscopy – for early lesions.

Other methods are

1. Voice recording – pre and post operative recordings of the patients voice
2. Maximum phonation time (MPT)
3. Mean airflow rate (MFR) during phonation
4. Fundamental frequency range of phonation and intensity range of phonation

PHONOSURGICAL PROCEDURES :

1. Microlaryngeal surgery
2. Medialisation of the vocal cord
3. Tucker's re-innervation technique
4. Neoglottic phonataria
5. Tracheo-oesophageal fistula with various prosthesis like Bloom Singer and Groningan etc
6. Intra cordal Teflon injection
7. Lateralisation of vocal cords
8. Relaxation of vocal cord
9. Tensing of vocal cord
10. Nerve transfer techniques (Hypoglossal – recurrent laryngeal nerve anastamosis)

REVIEW OF LITERATURE

1. Management of vocal nodule. A regional survey of otolaryngologist, speech and language pathologisc. (Sleen. M.S. Petti Jn-Tour of speech hearing Research 34 : 229-235, 1991)

   In adults both groups advised trail speech theraphy followed by surgery, while 26% of speech and language pathologist and only 5% of otolaryngologist advice surgery for children.

2. Vocal cord Nodule, A review (hanser et al Clinical otolaryngologist 13 : 43-15 / 1988) The approach to the treatment of vocal nodule has 3 modalities, voice rest, Microlaryngeal Surgery / vocal rehabilition.

3. Smoing cessationin chronic Reinke's edema, (hojslet et al J.Co 104 : 626-628 /1990). Stopping smoking alone is not sufficient as a treatment but if surgery is contemplated, patient must be urged strongly to stop smoking.

4. CO2 laser in laryngeal microsurgery. (G. Molto et al Acta otolaryngol. Suppl. 433, 1-30 / 1986). The CO2 laser is most useful in Reinke's edema polyp, dyskerotosis, Amylodosis.

5. Recurrent Respiratory papillomatosis and Acyclovix Indian SOPO 1993, March 26.

   Acyclovir is not recommended in Recurrent respiratory papillomatosis as it does not appear to influence the disease. Since

this drug activity depends upon presence of virally encoded thymidine kinase which is not known to be encoded by papilloma virus.

6. Vocal cord injection in children with unilateral vocal cord paralysis.

By Levine- BA; et al Department of Otorhinolaryngology head and neck surgery, children's hospital of Philadelphia. Arch-otolaryngol – Head and neck surg. 1995 Jan; 121 (1) 116-9

For severe aspiration and dysphonia vocal cord injection is an effective and viable therapeutic option for the management of unilateral vocal cord palsy in paediatric patients.

7. Laryngeal webs : a new treatment for an old problem By Stasney – CR, Van Lawrence voice institute at Baylor college of Medicine, Houston, Texas, USA.

Journal voice 1995 March 9 (1) 106-9

Laryngeal webs both congenital and acquired, present a difficult therapeutic challenge for the laryngologist.

An iatrogenic laryngeal web secondary to laser excision of anterior cordal papillomata presented with the double therapeutic challenge. On the one hand, he had recurrent papillomata on the other hand, he had a significant anterior web that was 7mm long and extended to within 3

mm of the tips of the vocal processes and involved the full thickness of the vocal folds. A new /old treatment was tried old ideas from chevalier Jackson coupled with newer technology using video laryngoscopy. Two patients underwent the procedure and had significant amelioration of their laryngeal pathology.

8. Teflon vocal fold augmentation failures and management

By Nakayama. M et al. Department of surgery, University of Wisconsin-Madison otolaryngology Head and Neck surg 1993 Sept; 109 (3) 493-8.

Although vocal fold augmentation by Teflon injection has been the mainstay of treatment for glottic insufficiency for three decades the success and safety have been overstated. Twenty eight patients who manifested poor or complicated Teflon results between 1984 and 1991 were evaluated using.

Accoustic

Aerodynamic

Videostroboscopic

Perceptual and subjective patient self evaluation of voice,

Both before and after our management of these complications. Most of these had Teflon granulomas ; sub glottic over filling was the most common condition. Management included microsurgical removal of the Teflon granulomas.

Worst results were in patients with scarring atrophy and bilaterally mobile vocal colds for whom Teflon should never have been injected. Teflon injection should be reserved for those instances in which it is clearly indicated and the surgeon is skilled in the technique of intrafold injection.

9. Videolaryngoscopy and videolaryngo stroboscopy in phoniatrics

By Vasilenko – IUS; Ivanchenko – GF et al Vestn – OTO rhinolaryngol. 1991 May Jun(3) : 38-41.

Clinical applications of video laryngoscopy (VLS) and videolaryngostroposcopy (VLSS) in phoniatrics were investigated. Altogether 150 patients with functional and organic lesions of the larynx and 50 normal subjects representing voice specialities were examined. Measurements of vibration, amplitude, frequency and oscillation asynchronicity of vocal cords yielded objective information about vibration in the norm and pathology. VLS and VLSS can help identify functional and organic diseases of the larynx, document various pathological processes, evaluate the condition of the vocal apparatus, and compare pre and post operative laryngoscopic pictures. These methods can find application in training and therapeutic procedures for biofeed back purposes.

CASE STUDY

CASE STUDY - 1 - MULTIPLE PAPILLOMA LARYNX

Ramalakshmi, 5 years old female child presented to the ENT Department.

HISTORY OF PRESENT ILLNESS

Change in cry of the baby since 8th month of age.

Noisy breathing since 1st year of age which increases on

Crying and on exertion

Noisy breathing increased in severity since 3 days

No history of fever / cough / foreign body aspiration

PAST HISTORY :

No history of intubation of Direct Laryngoscopy

ON EXAMINATION :

Inspiratory stridor present ,retraction of the intercostals muscle and substernal notch seen

No cyanosis, Temperature – Normal

Pulse : 100 / mt

Oral cavity : Normal

Indirect laryngoscopy : Not done

Nose and ears : Normal

Neck : Normal

SYSTEMIC EXAMINATION

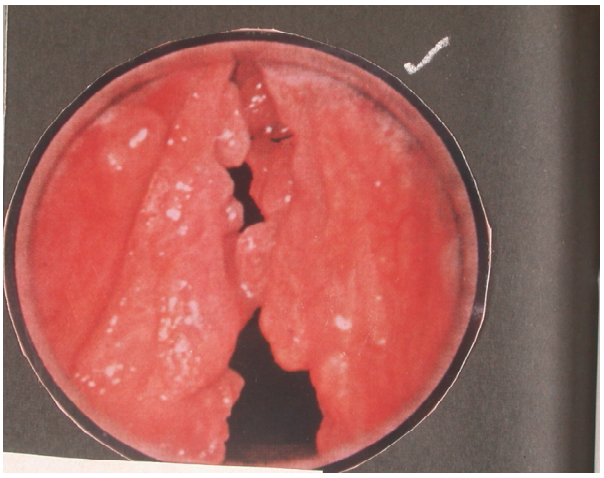
Respiratory : Air entry equal on both sides

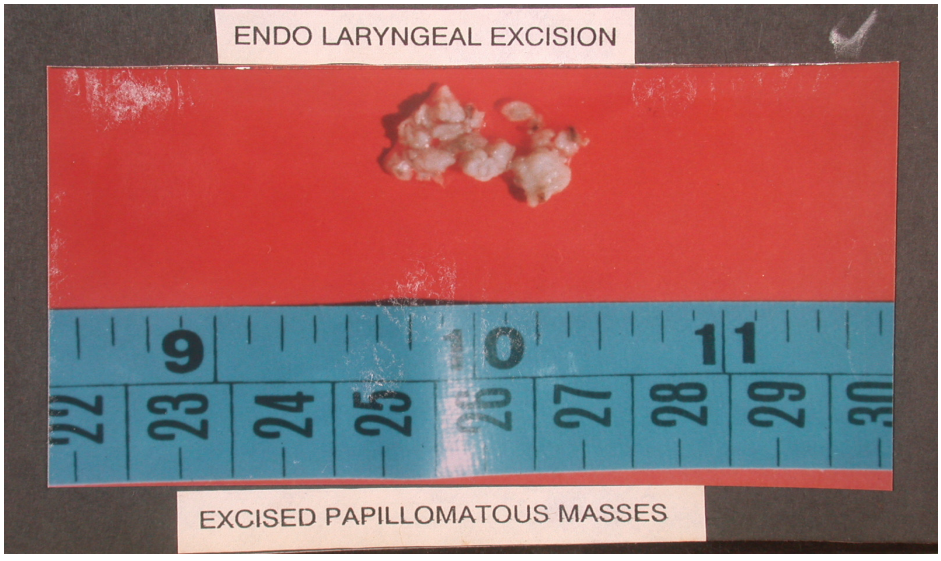
Cardio vascular system : Normal

Central nervous system : Normal

Abdomen : Normal

RECURRENT RESPIRATORY PAPILLOMATOSIS





INVESTIGATIONS

Blood and urine investigations	:	Normal
X-ray chest PA view	:	Normal

MANAGEMENT :

Direct laryngoscopy done under local anaesthesia. Papillomatous masses seen obscuring the glottic chink. Emergency tracheostomy was done under local anaesthesia. No.16 size tracheostomy tube was introduced. Direct laryngoscopy was done under general anaesthesia through tracheostoma using Kleinsasser's suspension laryngoscope and papillomatous masses seen obscuring the laryngeal inlet. Papilloma seen in the ventricular bands. Vocal cords, sub glottic region, excision done.

POST OPERATIVE PERIOD : Unevenful

Patient was treated with antibodies Inj. Ampicillin 250 mg IMBd.

Tracheostomy care was given

FOLLOW UP

Patient visited after 3 weeks after discharge, DL scopy examination and excision done under GA after 9 months . voice rest, relaxation & breathing training on voice production is given. Decannulation done and voice normal.

CASE STUDY : 2 - MULTIPLE PAPILLOMA LARYNX

Name / Age / sex : Jeyanthi / Female / 34 years

History of present illness :

Change of voice - 1 year

No H/o fever or difficulty in breathing

Past History :

No history of intubation

No vocal non professional

On Examination :

No Cyanosis

Temperature – Normal

Pulse - 90 / mt B.P. 120 / 80 mhg

Systemic Examination :

Respiratory system	:	Normal
Cardiovascular system	:	Normal
Central Nervous system	:	Normal
Abdomen	:	Normal

Local Examination :

Oral cavity	:	Normal
Ear and nose	:	Normal

Laryngeal and neck muscle tension is Normal

PAPILLOMA

Indirect Laryngoscopy :

A pink polypoidal mass seen in Left vocal cord at the junction of anterior 1/2 and posterior 2/3

Both vocal cords movement normal

Investigation :

Blood and urine examination : Normal

Provisional Diagnosis : Multiple papilloma larynx

Management :

Microlaryngeal excision of papilloma was alone under general anesthesia through orotracheal intubation. Kleinsasser's suspension Laryngoscope introduced and papilloma excised by microlaryngeal forceps. Margin of vocal cords sharpened by trimming the edges. Patient recovered from anaesthesia. Microlaryngeal excision done thrice. Tracheastomy was done at the age of 10. Post operative period uneventful.

Voice therapy given

Follow up :

Patient voice improving

CASE STUDY : 3 - VOCAL NODULE

Smt. Prema 34 years old house wife ; Christian by religion, a rice mill cooly by occupation reported in ENT department

HISTORY OF PRESENT ILLNESS

Change of voice - 8 months

Difficulty in speaking for 6 months with vocal fatigue

Voice breaks on and off

No history of

Noisy breathing

Difficulty in swallowing

Nasal regurgitation

Hearing defects

Recurrent URTI

Past History :

No history of intubation / DL scopy done

Non vocal non professional, she used to sing in the church carols.

ON EXAMINATION

No cyanosis

Temperature	:	Normal
Pulse	:	72 per minute
BP	:	110 / 70 mm of Hg

SYSTEMIC EXAMINATION

Respiratory system	:	Normal
Cardiovascular system	:	Normal
Central Nervous system	:	Normal

VOCAL NODULE

Abdomen : Normal

LOCAL EXAMINATION

Oral Cavity : Normal

Ears and Nose : Normal

Laryngeal and neck muscle tension is normal

Indirect laryngoscopy :

A millet sized glistening elevations were seen on both vocal cords margins at the junction of anterior 1/3 and posterior 2/3 of vocal cords.

INVESTIGATIONS :

Urine and blood examinations normal

PROVISIONAL DIAGNOSIS : VOCAL NODULES

MANAGEMENT

SPEECH THERAPY

1. Voice rest for one week
2. Pitch of the voice has to be lowered
3. Reduction in pharyngeal and laryngeal tension
4. Insist on quiet speech to cure nodules by reducing the friction between the vocal lips.
5.

FOLLOW UP

Reviewed after two weeks

RESULTS

Voice restored to normal after voice therapy

CASE STUDY : 4 VOCAL POLYP

Name : Davasi Age : 34 Female ; Fruit Vendor

Presented to the ENT department

History of present illness :

Change in voice one year

No h/o of breathelessness

Past History :

No h/o laryngeal surgery or intubation

On Examination

Indirect laryngoscopy

Pinkish polypoidal mass seen in left vocal cord at the junction of anterior 1/3 rd and posterior 2/3rd . Cord movements normal.

Investigation : Blood & Urine examination normal

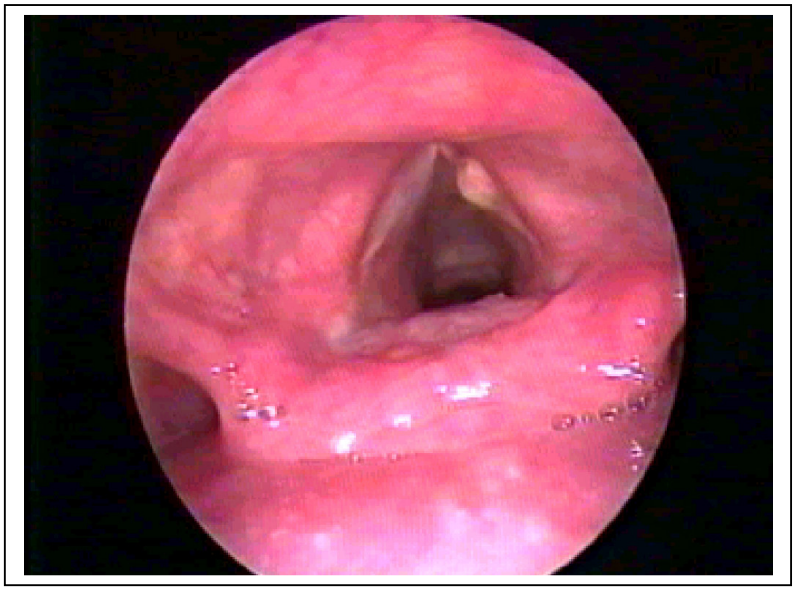
Diagnosis : Left vocal cord polp

Management : Surgery - Micro laryngeal excision of poly was done in general anaesthesia through oro tracheal intubation.

Polyp visualized using Kleinsasser's laryngoscope polyp removed by using micro laryngeal forceps. Perfect hemostasis advised voice rest given for 2 weeks.

Follow up : Normal voice was restored in a month.

VOCAL POLYP



CASE STUDY : 5 - ANGIOFIBROMA

Harikaran Male, conducted by profession, aged 30 years admitted in ENT department

History of present illness:

Change of voice 6 months duration

Voice fatigue

Voice breaks

Reduction of vocal range

No history of noisy breathing, Fever / Throat pain

Difficult in swallowing

History of voice abuse present

Close relative is having hard of hearing

Past history :

No history of intubation / DL scopy

Level of voice usage :

Non vocal ; Non professional

On examination :

No cyanosis

No stridor

Pulse : 72 / mt BP : 90 / 60 mm of Hg

CVS : Normal

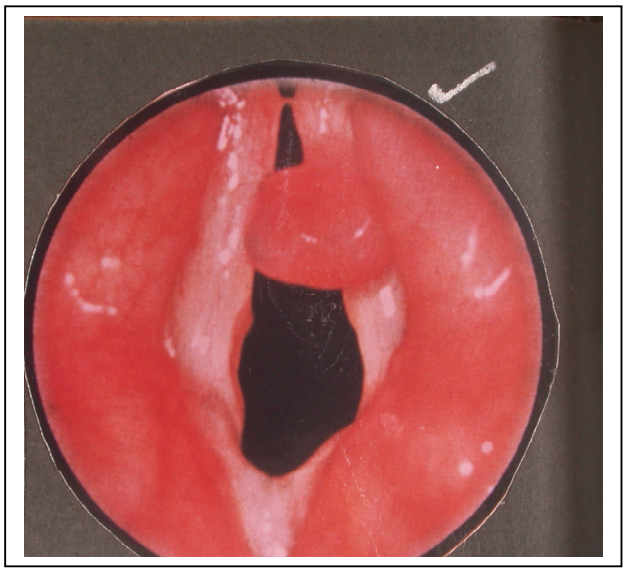
Rs : Normal

Local examination

Ear and nose : Normal

Laryngeal and neck muscle tension : Normal

ANGIOFIBROMA



INDIRECT LARYNGOSCOPY

A small smooth polypoidal growth seen on free border of right vocal cord at the junction of anterior 1/3 and middle 1/3. Both vocal cords movements are normal.

Investigation :

Blood and urine examinations : Normal

PROVISIONAL DIAGNOSIS :

Angiofibroma left vocal cord

MANAGEMENT

Speech therapy : Voice rest for one week pre operatively

SURGICAL

Direct laryngoscopy and microlaryngeal excision of fibroangiomatous polyp was done under general anaesthesia through orotracheal intubation. Kleinsasser's suspension laryngoscope was introduced and an angiomatous polyp was visualized in right vocal cord at the function of anterior 1/3 and middle 1/3. Same was removed using microlaryngeal forceps. Margins of right vocal cord was sharpned by trimming the edges of vocal cord. Scope was with drawn , perfect haemostasis secured. Patient recovered from anaesthesia. Inj. Decadron 8 mg was given intravenously during the procedure. Post operative period was uneventful. Voice rest for seven days post operatively.

Follow up : Patient came thrice for review in monthly intervals. speech therapy was given to advice to reduce vocal abuse. Biopsy report showed fibroangioma.

Result :

Patient voice was restored to normal. Follow up given.

CASE STUDY : 6 - INTUBATION GRANULOMA

Mr. Kumar 32 years male who was admitted in medical ward seven days back with history of snake bite was referred to ENT department.

HISTORY OF PRESENT ILLNESS :

Difficulty in speaking for the past 3 days

No history of fever / difficulty in breathing

PAST HISTORY

Patient had snake bite and was kept in IRCU endotracheal intubation for 10 days; Treated for snake bite

ON EXAMINATION :

No Cyanosis : Temperature : Normal

Pulse : 72 per minute

BP : 120 / 80 mm of Hg

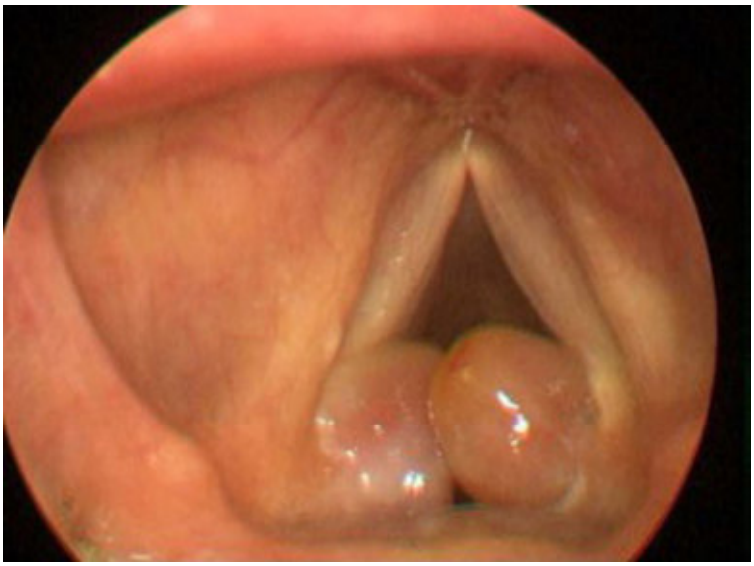
SYSTEMIC EXAMINATION

Respiratory system	:	Normal
Cardiovascular system	:	Normal
Central Nervous system	:	Normal
Abdomen	:	Normal

LOCAL EXAMINATION

Ears and Nose	:	Normal
Laryngeal and neck		
Muscle tension	:	Normal

INTUBATION GRANULOMA



INDIRECT LARYNGOSCOPY :

Posterior 1/3 of tongue, vallecula, epiglottis, aryepiglottic fold, aytenoids and pyriform sinuses were normal, congested and patchy appearance with granular elevation seen in mid of vocal cord margins on either side and ventricular bands. Movements were normal.

INVESTIGATIONS

Urine examination	:	Normal
Blood sugar	:	150 mgms %
Serum creatinine	:	0.9 mgms %
Serum electrolyte	:	Na ++ 124 mgms %; K+ 4.2 mgms %

PROVISIONAL DIAGNOSIS : INTUBATION GRANULOMA

MANAGEMENT

VOICE THERAPY :

1. A reduction in pharyngeal tension, attention to relaxation and central breathing
2. Vocal exercise on higher pitch to reduce oedema

FOLLOW UP

Patient was followed bi weekly. Patches and ulcerations disappeared after 3 weeks.

RESULT:

Normal voice came back after 1 month voice therapy.

CASE STUDY – 7 : T. B. LARYNGITIS

Mr. Narayanasamy 51 years male reported to the ENT department.

HISTORY OF PRESENT ILLNESS :

Hoarseness of voice 3 months

Cough and cold with expectoration for the past 6 months

Evening rise of temperature for 4 months

Loss of weight for 2 months

Loss of appetite for 1 month

No history of difficulty in breathing / foreign body aspiration

PAST HISTORY :

An alcoholic, smoker twenty to thirty beedis per day. Voice abuse +

ON EXAMINATION

No Cyanosis

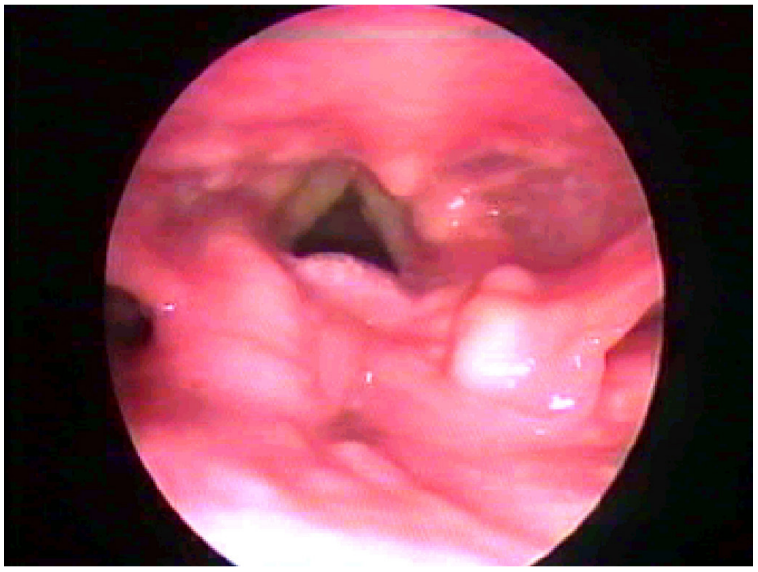
Temperature	:	Normal
Pulse rate	:	72 per minute
BP	:	130 / 80 mm of Hg

SYSTEMIC EXAMINATIONS

Respiratory system: Trachea shifted to the left cavernous breathing over left infra & supra mammary region.

Cardiovascular system	:	Normal
Central Nervous system	:	Normal
Abdomen	:	Normal

TUBERCULOUS LARYNGITIS



LOCAL EXAMINATION

Ears and nose : Normal

Oral cavity : Normal

INDIRECT LARYNGOSCOPY :

Posterior 1/3 of tongue, vallecula, epiglottic, aryepiglottic folds normal. Pooling of saliva in pyriform sinuses and post cricoid area : vocal cords showed mouse nibbled appearance with white patches. Movements Normal.

INVESTIGATION:

Urine : Normal

Blood : Lymphocytosis : Raised ESR

X ray chest PA view : Cavity in left midzone

Sputum for AFB : Negative

PROVISIONAL DIAGNOSIS: Tuberculous laryngitis

MANAGEMENT

Medical : Anti tuberculous treatment

Cap, Rifampicin 450 mg od on empty stomach

T. Isonex 300 mg od

T. Ethambutol 800 mg od

T. B Complex 1 od for 9 months

VOICE THERAPY :

1. A reduction in pharyngeal tension attention to relaxation and central breathing.
2. Vocal exercise on higher pitch to reduce edema

FOLLOW UP

Once in a month

RESULT

Voice improved : Improved

CASE STUDY - 8 : VOCAL CORD PARALYSIS

Selvi. S. Vilvapriya 19 years female attended ENT department

HISTORY OF PRESENT ILLNESS :

Hoarseness of voice 3 months duration

Reduction of vocal range noisy breathing on exertion for 2 months

No history of stridor / dysphagia

History of laryngeal spill over present

PAST HISTORY

Underwent total thyroidectomy 4 months back

LEVEL OF VOICE USAGE :

IV - Non vocal non professional

GENERAL EXAMINATION :

No cyanosis

Pulse : 72 / mt

BP : 110 / 70 mm of Hg

SYSTEMIC EXAMINATION

Respiratory system : Normal

Cardiovascular system : Normal

Central Nervous system : Normal

Abdomen : Normal

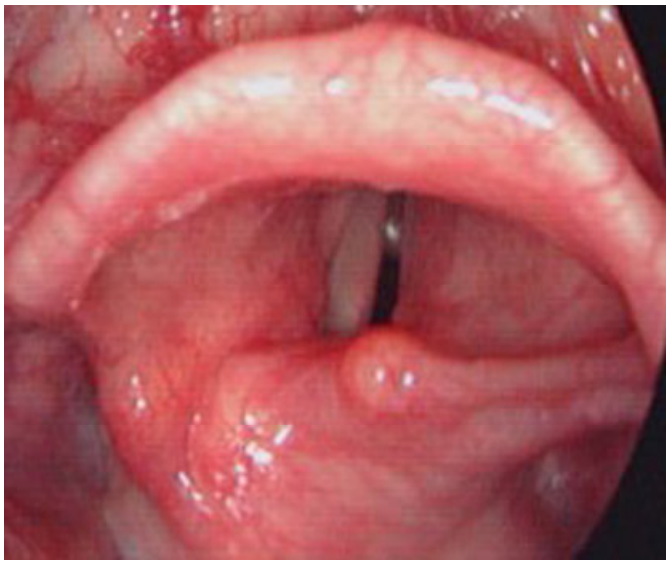
LOCAL EXAMINATION

Ears and nose : Normal

Operated scar in the anterior aspect of neck

Laryngeal and neck muscle tension : Normal

VOCAL CORD PALSY



INDIRECT LARYNGOSCOPY

Vocal cords structure normal. Left cord found in para median position not moving. Right cord attempts to compensate and opposes the left cord. Minimal phonatory waste present.

INVESTIGATION :

Urine and blood examination	:	Normal
X-ray chest PA view	:	Normal
T3 and T4 assay	:	Normal

PROVISIONAL DIAGNOSIS

Left vocal cord palsy as a sequlae of thyroidectomy surgery

MANAGEMENT

Medical : T. Eltroxine 0.1 mg od. Daily

SPEECH THERAPY :

Exercises to obtain better adduction of cords :

1. Laugh or cough and endeavour to prolong the spasmodic phonation thus achieved into a protracted vowel.
2. Swallow and phonate
3. Link the fingers, lift arms to level of clavicle and pull against each other while phonating.
4. Push the hands against the table and phonate. Practiced at frequent intervals but for short periods only.

Results :

Patient voice improving.

CASE NO. 9 - VOCAL CORD PALSY

Mr. Rajendran 44 years old male attended to ENT department

History of Present illness :

Difficulty in speaking for the past 20 days

No history of stridor / dysphagia

History of laryngeal spill over present

Past History :

Patient under went 'patch aortoplasty' major thoracic surgery in left hemi thorax as per record. After surgery patient developed hoarseness of voice.

Level of Voice Usage :

IV non vocal non professional

General Examination :

No cyanosis

Pulse : 72 per minute

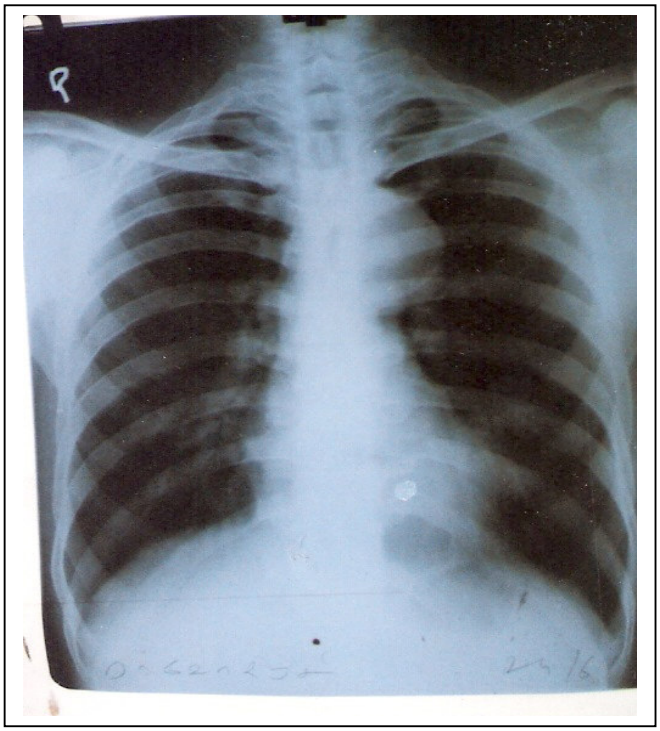
BP : 120 / 80 mm of Hg

Systemic Examination :

Respiratory system	:	Normal
Cardiovascular system	:	Echo shows saccular aortic aneurysm distal to left subclavian artery
Central nervous system	:	Normal
Abdomen	:	Normal

PATIENT UNDERGONE "PATCH AORTO PLASTY" FOR AORTIC ANEURYSM' WITH POST OPERATIVE LEFT VOCAL CORD PALSY

X – RAY SHOWING "AORTIC ANEURYSM



Local Examination :

Ears and nose : Normal

Neck and laryngeal muscle tension : Normal

Operated scar seen in left side of thorax

Indirect Laryngoscopy :

Vocal cords structure normal. Left vocal cord is in paramedian position. Not moving, phonatory gap present. Right cord not opposing and no compensatory movement.

Investigation :

Urine and blood examination : Normal

Blood VDRL : Non reactive

Cath lab : Saccular aneurysm distal to left sub clavian artery

ECG : Sinus rhythm 75 per minute vertical heart

Left ventricular hypertrophy

Right ventricular strain + SV2 ; No ST wave change

Blood grouping : B +ve

Provisional Diagnosis :

"Left recurrent laryngeal nerve palsy as a post operative sequlae of patch aortoplasty.

CASE STUDY : 10 - BILATERAL ABDUCTOR PALSY

Name : Andisamy 7/ Male Bilateral Abductor palsy, Student

C/o Difficulty in breathing more on exertion

Voice change / fatigability of voice

Past History:

No H/o Hospitalization

No H/o Primary complex

No H/o CVS or CNS disorders

O/E Patient conscious, afebnite

Pulse – 80 / md

CVS NAD / RS NAD stridor +

ENT Examination

Indirect both vocal cords in Adducted position

Direct laryngoscopic examination

Both vocal cords in Adducted position / structure of vocal cords normal.

Other structures Normal

Investigation :

Blood TC, DC, Hb

ESR

X ray chest / X ray neck BP / lateral

Treatment :

Permanent tracheostomy done

Patient relieved of stridor

Follow up

On speech therapy for restoration of voice

BILATERAL ABDUCTOR PALSY

CASE STUDY - 11 MALIGNANT GROWTH RIGHT VOCAL CORD

Name : Karuppanan, 33, Male Fruit vender

C/o Hoarness of voice – larynx

Breathless on exertion – 2 months

H/o Present illness :

H/o Hoarness of voice - 1 year

H/o Breathless on exertion

No H/o dysphasia

O/E Conscious, oriented, Pulse 90/mt BP 120/80

RS NVBS
CVS – S1 S2 +

Indirect laryngoscopy : White mass with irregular surface seen in anterior 2/3rd of right vocal cord. Right cord movement restricted.

Diagnosis : Right glottic growth

Investigations : Urine & blood examination Normal
Chest X ray Normal
Neck x ray AP & lateral view normal
Mantoux - Negative
Biopsy - Moderately differentiated squamous cell Carcinoma

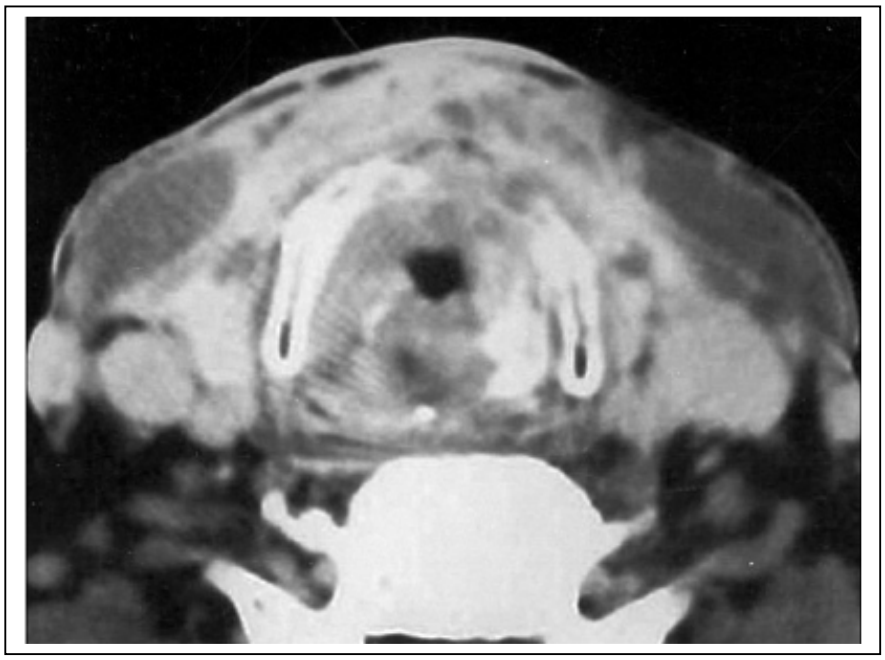
Treatment :

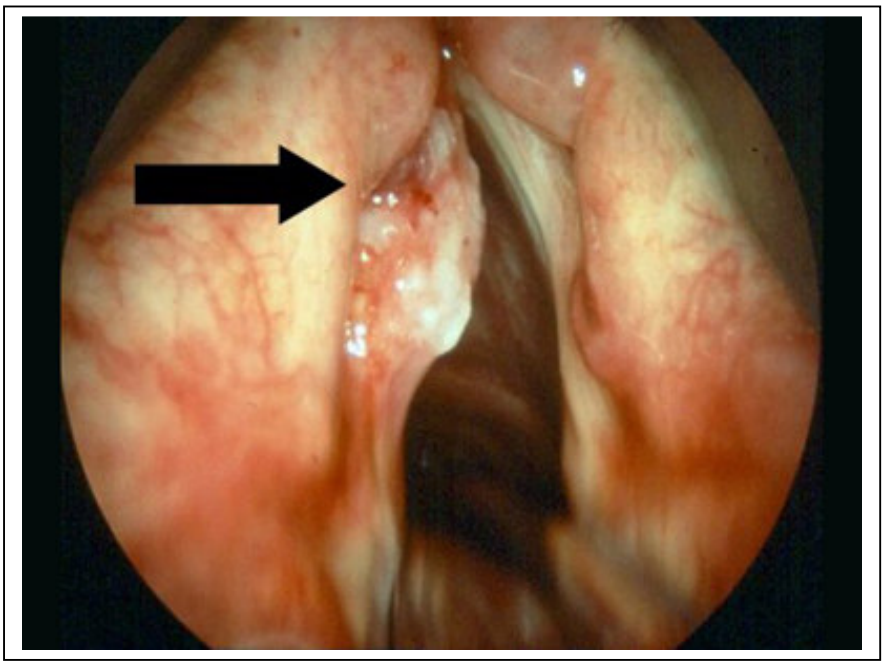
Radio therapy given

Follow up :

Voice improved. Advised regular follow up.

VOCAL CORD CARCINOMA





OBSERVATION

The study includes 50 cases of vocal cord pathology, carefully selected from the patients attending the outpatient department in Government Rajaji Hospital, Madurai, ENT Department and Institute of Child Health, Madurai from February 2004 to January 2006.

1. AGE DISTRIBUTION

In our study it is observed that 64% of cases fall in age group 21-50 yrs.

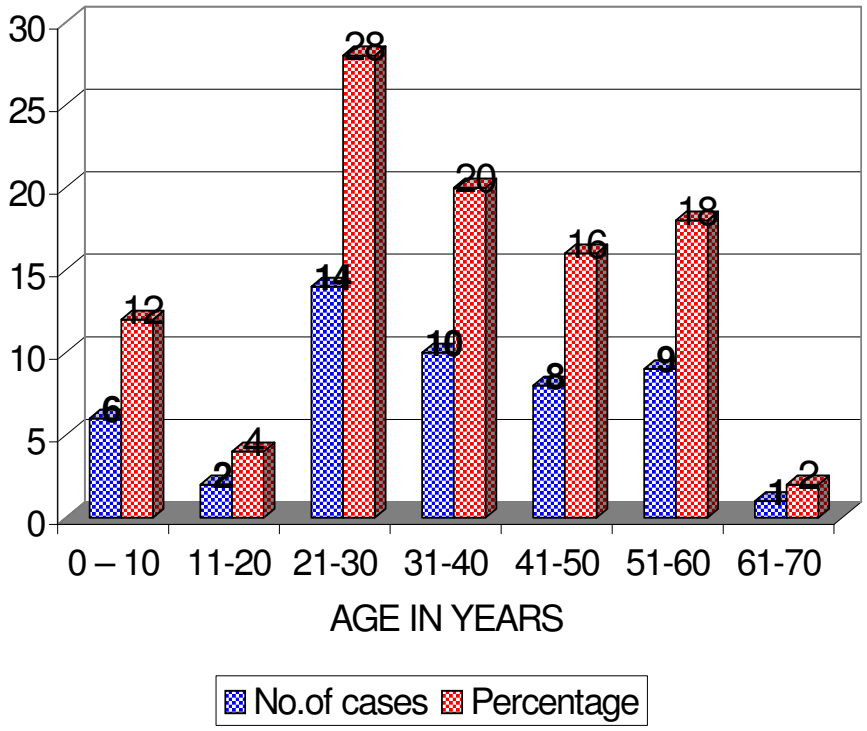
But recurrent respiratory papillamatosis occurs in age 0-10 years

Distribution of cases in different age groups is given in table – 1.

TABLE – 1

S.No.	Age	No.of cases	Percentage
1.	0 – 10	6	12
2.	11-20	2	4
3.	21-30	14	28
4.	31-40	10	20
5.	41-50	8	16
6.	51-60	9	18
7.	61-70	1	2

AGE DISTRIBUTION



2. SEX INCIDENCE

Males are commonly affected in our study. Sex wise distribution is given in Table – 2.

TABLE - 2

Sex	No.of cases	Percentage
Male	36	72
Female	14	28

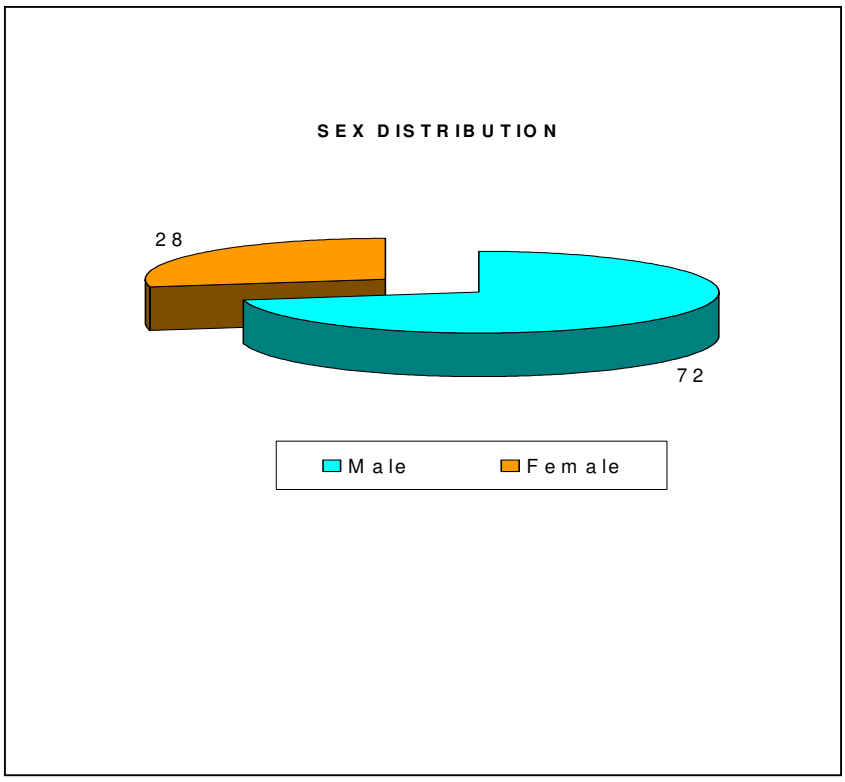
3. SYMPTOMATOLOGY

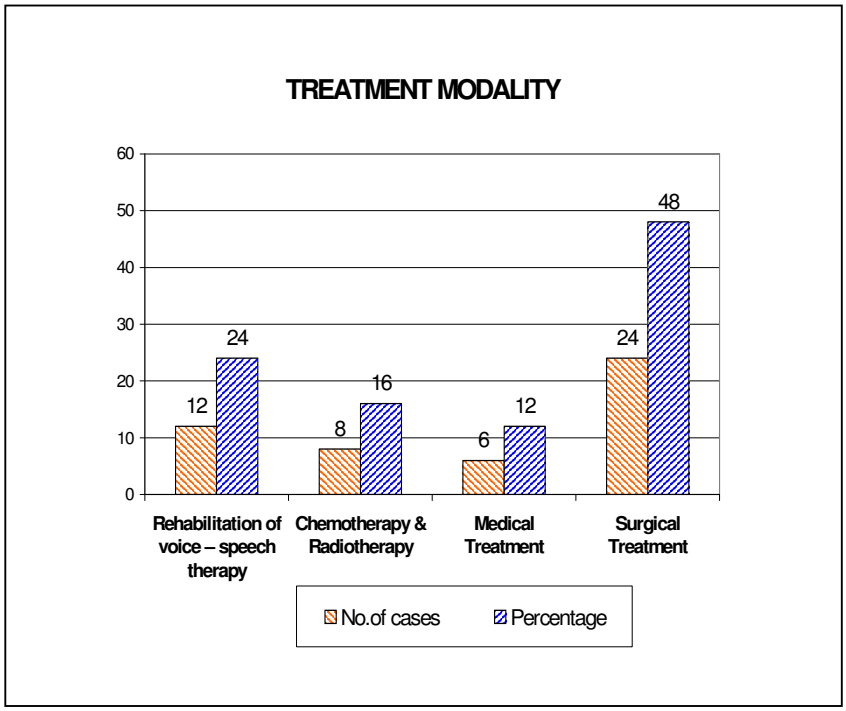
Hoarsness is the commonest symptoms, about 72% of our cases present with Hoarsness of voice. Stridor is the next common symptom about 28%. Most of cases of Recurrent respiratory papillomatosis and carcinoma vocal cord presented with stridor.

Others symptoms are laryngeal spill over vocal fatigue

TABLE - 3

S.No.	Symptom	No.of cases
1.	Hoarsness	36
2.	Stridor	14
3.	Laryngeal spill over	10


SEX DISTRIBUTION
28
72
Male
Female


TREATMENT MODALITY
60
50
40
30
20
10
0
12
24
8
16
6
12
24
48
Rehabilitation of voice – speech therapy
Chemotherapy & Radiotherapy
Medical Treatment
Surgical Treatment
No.of cases
Percentage

4. AETIOLOGICAL DISTRIBUTION

Aetiological distribution of cases in our study is given in table 4

TABLE - 4

S.No.	Aetiology	No.of cases	Percentage
1.	Congenital – Bilateral Abductor palsy Glottic web	1	2
2.	Inflammatory - Vocal polyp	11	22
	Vocal Nodule	7	14
	Reinkes edema	1	2
	Keratosis	1	2
	Contact pachydermia	-	-
	Intubation granuloma	1	2
3	Granulomatous – Tuberculosis	2	4
4.	Papilloma - Recurrent respiratory papillomatosis Squamous papilloma	8	16
5.	Vocal cord paralysis – Post thyroidectomy Carcinoma lung, Thymoma	6	12
6.	Carcinoma	12	24

5. TREATMENT MODALITY

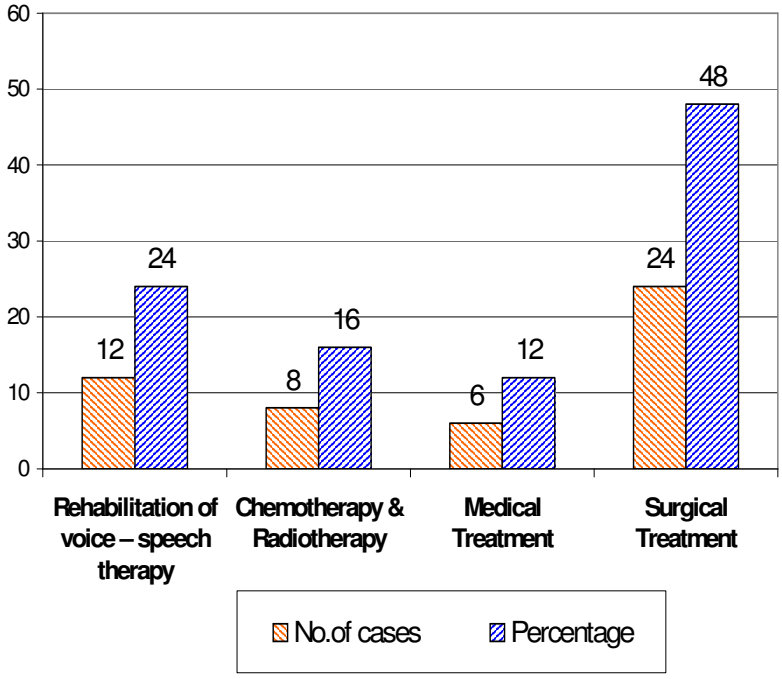
1. Medical Treatment
2. Surgical treatment - Microlaryngeal surgery
   Phono surgery
   Tracheostomy
3. Chemotherapy
   Radiotherapy Curative & palliative
4. Conservation treatment
5. Rehabilitation of voice - Speech therapy
   - Voice prosthesis

Microlaryngeal surgery is the commonest modality of treatment ever since they are popularized by Kleinsausser in 1961. 47% of cases were treated surgically followed by voice rehabilitation. Malignant lesion were treated with Radiotherapy after direct laryngoscopic examination and histopathological examination and proving malignancy.

TABLE - 5

S.No.	Treatment modality	No.of cases	Percentage
1.	Rehabilitation of voice – speech therapy	12	24
2.	Chemotherapy & Radiotherapy	8	16
3.	Medical Treatment	6	12
4.	Surgical Treatment	24	48

TREATMENT MODALITY



6. PROGNOSIS

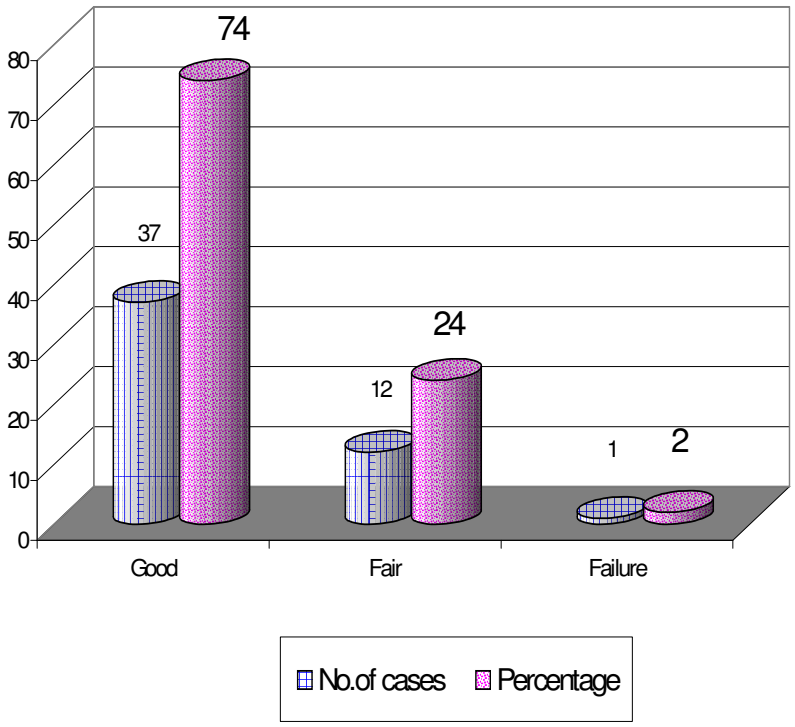
Cases of inflammatory aetiology have done well with microlaryngeal surgery followed by voice rest and speech theraphy. In recurrent respiratory papillomatosis results were unsatisfactory with recurrence and post operative complication like stenosis. Carcinoma to vocal cord respond well to regular radiotherapy.

TABLE - 6

PROGNOSIS

S.No.	Prognosis	No.of cases	Percentage
1.	Good	37	74
2.	Fair	12	24
3.	Failure	1	2

PROGNOSIS


74
80
70
60
50
37
40
24
30
12
20
1
2
10
0
Good
Fair
Failure
No.of cases
Percentage

DISCUSSION

- ✓ Proper detailed history taking from the patient or parents gives vital importance.
- ✓ Thorough clinical examination and Indirect laryngoscopic examination are atmost needed for diagnosis in most cases, where hoarseness is for more than 2 weeks.
- ✓ Basic supportive investigation like x ray, haemogram is done for all cases
- ✓ Preparation of cases with counselling to the patient and attenders about details of treatment and outcome done.
- ✓ Written informed consent obtained - for microlaryngeal surgery
  for tracheostomy
- ✓ Tracheostomy was avoided in most of cases until indicated strictly
- ✓ Treatment was aimed at through surgical clearance to prevent recurrence
- ✓ Specimen sent for Histopathological examinations
- ✓ Post operative steroids given to prevent immediate post operative laryngeal edema
- ✓ All cases were subjected to intensive speech therapy
- ✓ By adhering to above protocols, cure rate was good.
- ✓ Microlaryngeal excision is still safe, cost effective and careful method for many benign lesions of vocal cord.

CONCLUSION

Our study concludes by saying

- Common age group with vocal cord pathology is 21-50 years
- Males are more commonly affected than females (72%)
- Hoarsness of voice is the most common symptom, stridor is second common presenting symptom
- Benign lesion of vocal cord are commoner than malignant lesion
- Vocal polyp is common among non-neoplastic lesions
- Squamous cell carcinoma common among malignant lesions
- Occupation with vocal strain is a common precipitating factor for benign lesions
- Smoking is common precipitating factor in malignant lesions
- Vocal cord palsy is most commonly seen following thyroidectomy surgery and also following patch aortoplasty and thymectomy surgeries.
- Tracheostomy is indicated whenever there is an airway obstruction.
- Combined modality of treatment out weighs simple modality
- Early intervention and proper follow up improves the prognosis of vocal cord disorder.

BIBLIOGRAPHY

1. A reads MJ. Wythe AW, Bird CC. Papilloma vira and human cancer. Human pathology : 21 : 686 – 698, 1990.
2. Alverti PW et al. Adult laryngeal papillomala. J. Otol. 10 : 463 -70, 1981.
3. Bastian, R.W., Keider, A and Verdolini, M.K. (1990) : Detection of vocal fold pathology. Journal of voice : 172-183
4. Batsakis : Tumours of clinical and pathological consideration. Baltimose, The Williams and wilkins company 1979, page 254-261.
5. Chatterji. (1974) Indian Journal of otolaryngology
6. Doycle DJ. Henderson LA. Lepeune FE : Human papilloma viruses typing of recurrent respiratory papillometosis progressing to malignant neoplasm. Arch otolaryngol.
7. Fuji Mura O : Fiberoptic observation of vocal cord and movements ASHA report, Rock ville, Maryland 1981.
8. Gesterud. A. Ejnell.H., Long term results with a simple surgical treatment of boloceial vocal cord paralysis, laryngoscope, 1990, Step 100.
9. Grund Fast K.W. Harcey. E. Vocal cord paralysis otolaryngal Clinic North Ann. 1980, June 22.(3) 569-97

10. Hollinger P et al, Benign tumours of larynx Ann. Otolaryngol 60 : 496-509, 1951.

11. Klein Sasser, O. 1982 : Pathogenesis of vocal cord polyps. Annals of otology, rhinology and laryngology 91 : 378

12. Kleinssaser's O : Juvenile and adult papilloma of the larynx : NNO 21 : 97 – 106, 1973.

13. Lastellollanos F. Spector G. Tumours of larynx otolaryngology. Head and neck Surgery : 3, 15th edition,417 – 438, 464-593.

14. Mantra vadi RVP, Liebner EJ, Haas re et al. Cancer of glottis, prognostic factor in radiation theapy.

15. MC. Labe, B.C. and Clark KF 1983. Interferon and laryngeal papillomatosis. Annals of otology, rhinology, laryngology 92 :2.

16. Otolaryngol, Clinic of North America office evaluation of ENTvol25

17. Otolaryngology vol III, Micheal paparelle.

18. Otolaryngology clinic of North America airway obstruction – vol 28.

19. Report of the population based cancer, Registry (PBCR) of Chennai Region ICMR – 2001.

20. Robin T. Cotton : Congenial laryngeal anomalies, Oto tol of North America vol 14.

21. Shaw. W (1979) Tumours of larynx in : Scott Bronch diseases of ear, nose and throat, 4th edition, edited by Ballantyne and J. Gove.

22. Simson Hall, Anatomy of Larynx. Disease of Ear, Nose, Throat.

23. Smith E. Ittuman papilloma virus & risk of laryngeal cancer. Ann. Otol striod laryngol 109 ; 1069-1076.

24. Snelts : Clinical anatomy page 21

25. Snow , J.B. Tr (1984) : Surgical therapy for vocal dysfunction. Otolaryngologic clinic of North America 17(1) : 9 -100

26. Stell and Marans Head and neck Surgery Ed by A.G.D. Maren et al page 106-138.

27. Weir Neil. "Anatomy of the larynx and tracheo bronchial tue. In Gleeson Michael Scott – Brown's Basic Science Vol – 1, 6th edition. London. 1/12/1 to 1/12/28, 1/4/1 to 1/4/27, 1987.

28. Weiss, M.D. and Kashima HK (1983) : Tracheal involvement in laryngeal papillomatosis. Laryngoscope : 93 : 45

29. Year book of otol & Head and neck Surgery edited by paperello 1989-94.

MASTER CHART

S.No.	Name	Age	Sex	Occupation	Hoarsness of voice	Vocal fatigue	Stridor	Laryngeal spill over	Dyspnoea on exertion	Dysphagia	Fever	Haemoptysis	Throat pain	Diagnosis	Treatment	Prognosis
1	Andisamy	7	M	Student	+		+		+		+			B/L AP	PT	Fair
2	Govindan	38	M	Farmer	+	+			+					RE	MLS	Good
3	Velusamy	49	M	vendor	+	+				+			+	K	MLS	Fair
4	Narayanan	51	M	Farmer	+				+		+	+		T.B.L	ATT	Good
5	Muthu	46	M	Farmer	+				+	+	+	+	+	T.B.L	ATT	Good
6	Reena	24	F	Clerk	+	+					+			S.P	MLS	Good
7	Prema	23	F	H.wife	+	+					+			S.P	MLS	Good
8	Kumar	13	M	Student	+	+					+			RRP	MLS	Fair
9	Murugan	7	M	Student	+	+								RRP	MLS/T	Fair
10	Siva	5	M	Pre-school	+		+							RRP	MLS	Good
11	Ramalakshmi	5	F	Student	+		+							RRP	MLS	Good
12	Mohideen	5	M	Student	+		+							RRP	MLS/T	Fair
13	Vijaya shobana	26	F	Housewife	+		+							RRP	MLS/T	Fair
14	Jeyanthi	34	F	House wife	+		+		+				+	RRP	MLS/T	Fair

15	Karuppanan	33	M	Vendor	+		+							RGG	RT/T	Fair
16	Naga Devar	70	M	Cooly	+		+	+	+				+	RGG	RT/T	Fair
17	Bommiya	62	M	Labour	+			+						LGG	RT	Good
18	Kalavathy	35	F	House wife	+				+					RGG	RT	Good
19	Ganesan	54	M	Business	+								+	RGG	RT	Good
20	Muthusamy	50	M	Farmer	+			+	+					RGG	RT	Good
21	Manickam	65	M	Farmer	+									GG Both	CT	Fair
22	Iyyavoo	60	M	Farmer	+			+			+		+	RGG	RT	Good
23	Angu	42	F	HW	+			+	+					LGG	RT	Good
24	Subbaredaly	42	M	Coolly	+				+					RGG	RT	Failure
25	Villi	72	M	Driver	+			+						RGG	RT	Good
26	Chelladurai	55	M	Farmer	+		+	+	+				+	GG Both	RT/T	Good
27	Ramar	33	M	Farmer	+			+		+	+	+		R VCP	ST	Fair
28	Rengaraj	72	M	Vendor	+		+						+	LGG/P	RT/ST	Good
29	Rajendran	44	M	Business	+		+		+					VCP	RT	Good
30	Mariammal	20	F	Student	+								+	LVCP	ST	Fair
31	Kamalam	23	F	House wife	+	+		+		+			+	LVCP	ST	Good
32	Kumar	8	M	Student	+	+		+						RRP	MLS/ST	Good

33	Jeyanthi	24	F	Housewife	+					+				LVCP	ST	Progn.
34	Murugan	30	M	Vendor	+	+							+	VN	MLS/ST	Good
35	Prema	34	F	Teacher	+	+								VN	MLS/ST	Good
36	Saraswathi	36	M	Profession	+	+		+						VN	VR/ST	Good
37	Harikaran	30	M	Conductor		+							+	AF	MLS/ST	Good
38	Thavasi	24	F	House wife		+								RVP	MLS/ST	Good
39	Guru	47	M	Salesman	+	+								VN	MLS/ST	Good
40	Kamaraj	45	M	Bank clerk	+	+								LVP	MLS/ST	Good
41	Jeya	30	F	House wife	+									LVP	MLS/ST	Good
42	Palanisamy	47	M	Teacher	+									RVP	MLS/ST	Good
43	Kumar	32	M	Farmer	+			+	+				+	IG	VR	Good
44	Parvathy	48	F	Singer	+	+							+	RVP	MLS/ST	Good
45	Saroja	20	F	Student	+	+								LVP	VR/ST	Good
46	Veeriah	40	M	Business										RVP	VR/ST	Good
47	Kavitha	15	F	Student	+									VN	VR/ST	Good
48	Rajeswari	23	F	Housewife	+									VN	MLS/ST	Good
49	Mahalakshmi	13	F	Beedi worker	+									RVP	MLS/ST	Good
50	Chitra	53	F	Singer	+								+	RVP	MLS/ST	Good

ABBREVIATIONS

AF	-	ANGIO FIBROMA	MLS	-	MICRO LARYNGEAL SURGERY
VN	-	VOCAL NODULE	ST	-	SPEECH THERAPY
VP	-	VOCAL POLYP	VR	-	VOICE REST
RRP	-	RECURRENT RESPIRATORY PAPILLOMATOSIS	T	-	TRACHEOSTOMY
SP	-	SQUAMOUS PAPILLOMA	RT	-	RADIO THERAPY
K	-	KEROTOSIS	ATT	-	ANTI TUBERCULOUSIS TREATMENT
IG	-	INTUBATION GRANULOMA	TL	-	TUBURCULOSIS LARYNX
RE	-	REINKES EDEMA	CT	-	CHEMOTHERAPY
GG	-	GLOTTIC GROWTH			
VCP	-	VOCAL CORD PALSY			